Cytogenetic and Genotoxic Effects of Penconazole and Chlorpyrifos Pesticides in Bone Marrow of Rats

Abstract:

The current study was undertaken to explain the cytogenetic and genotoxic effects of penconazole (PEN) fungicide and chlorpyrifos (CPF) insecticide in male rats. Rats (n=10/group) were treated with 500 mg/kg body weight PEN orally for 24 h, 48 h and 100 mg/kg body weight for 30 days and the control animals were administered distilled water only. Chlorpyrifos exposed groups received 39 mg/kg body weight for 24 h and 48 h and 8 mg/kg body weight for 30 days by oral gavage and the control group was received corn oil. Blood samples were collected for complete blood count. Bone marrow was flushed from the femur bones for chromosomal aberration (CA) and comet assay. Spleen samples were preserved in 10% formalin for histopathological examination. The level of DNA damage was measured using DNA damage index. The results showed that PEN and CPF caused significant hematological changes, significant increase in DNA damage index and increased the number of nuclei with I, II, III and IV degrees of damage. Different types of CA were recorded in PEN and CPF exposed groups including chromosomal break, deletion, attenuation, chromosome ring, gap and fragments. In addition, numerical aberration as polyploidy appeared in CPF exposed groups only. PEN and CPF caused histopathological changes in spleen in the form of apoptosis, congestion, thrombosis and hemosiderosis. In conclusion, PEN and CPF induced genotoxic and cytogenetic effects in bone marrow. DNA damage index and the percentage of CA were higher in CPF than PEN groups.

Keywords:

Penconazole; Chlorpyrifos; Chromosomal aberrations; DNA damage; Spleen

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